

WHAT IS CLAIMED IS:

*Sub B6* 1. A data transfer system comprising:  
2 a plurality of bus devices, at least one bus device being  
3 a bus data supplying device capable of supplying data, at  
4 least one bus device being a bus data receiving device capable  
5 of receiving data and at least one bus device being a bus  
6 master device capable of requesting and controlling data  
7 transfer;  
8 a data bus connected to each of said plurality of bus  
9 devices and capable of transferring data from a bus data  
10 supplying device to a bus data receiving device under control  
11 of a bus master device;  
12 a direct memory access unit connected to said data bus as  
13 a bus master device, said direct memory access unit including  
14 a source word size register storing a source word  
15 size, and  
16 a target word size register storing a target word  
17 size,  
18 said direct memory access unit capable of transferring data  
19 from a first bus data supplying device to a first bus data  
20 recalling device via said first bus by recalling data from a  
21 first bus data supplying device in a data size corresponding  
22 to said source word data size and supplying said recalled data  
23 to a first bus data receiving device in a data size  
24 corresponding to said target word size.

1 2. The data transfer system of claim 1, wherein:  
2 said direct memory access unit further includes

Sub B6

3 a read data register loaded with data from said bus  
4 data supplying device via said data bus in said source  
5 word size,  
6 a write data register supplying data to said bus  
7 data receiving device via said data bus in said target  
8 word size, and  
9 a word formatter connected to transfer data from  
10 said read data register to said write data register  
11 thereby aligning data in said target word size in said  
12 write data register.

1 3. The data transfer system of claim 2, further  
2 comprising:

3 at least one first bus device being a first bus  
4 supplying/receiving device capable of both supplying data to  
5 said first bus and receiving data from said first bus.

1 4. The data transfer system of claim 3, wherein:

2 at least one first bus supplying/receiving device  
3 consists of a central processing unit which is further capable  
4 of controlling data transfer.

1 5. The data transfer system of claim 3, wherein:

2 at least one first bus supplying/receiving device  
3 consists of a direct memory access unit which is further  
4 capable of controlling data transfer.

pub B6  
1 6. The data transfer system of claim 3, wherein:  
2 at least one first bus supplying/receiving device  
3 consists of a memory which is not capable of controlling data  
4 transfer.

1 7. The data transfer system of claim 3, wherein:  
2 at least one first bus supplying/receiving device  
3 consists of a central processing unit which is further capable  
4 of controlling data transfer, said central processing unit  
5 connected to said direct memory access unit for loading data  
6 into said source data size register and into said target data  
7 size register.

1 8. The data transfer system of claim 3, wherein:  
2 said direct memory access unit further includes  
3 a source start address register storing a source  
4 start address,  
5 a source increment size register storing a source  
6 increment size,  
7 a target start address register storing a target  
8 start address,  
9 a target increment size register storing a target  
10 increment size,  
11 said direct memory access unit recalling data from said first  
12 bus data supplying device beginning at said source start  
13 address and thereafter at successive addresses differing by  
14 said source increment size and supplying said recalled data to  
15 said first bus data receiving device beginning at said target  
16 start address and thereafter at successive addresses differing  
17 by said target increment size.

*Sub B6* → 1 9. The data transfer system of claim 8, wherein:  
2 at least one first bus supplying/receiving device  
3 consists of a central processing unit which is further capable  
4 of controlling data transfer, said central processing unit  
5 connected to said direct memory access unit for loading data  
6 into said source start address register, said source increment  
7 size register storing, said target start address register and  
8 said target increment size register.

1 10. The data transfer system of claim 3, further  
2 comprising:

3 a bus arbiter connected to each of said at least one bus  
4 master device, said direct memory access unit and said first  
5 bus, said bus arbiter granting control of data transfer on  
6 said data bus to one and only one bus master device; and  
7 said direct memory access unit further includes

8 a counter value register storing a number of data  
9 words to be transferred by said direct memory access  
10 unit,

11 a block size register storing a block size to be  
12 transmitted without interruption,

13 said direct memory access unit requesting bus control from  
14 said bus arbiter and upon grant of control of data  
15 transmission on said data bus, said direct memory access unit  
16 thereafter

17 transferring data in an amount equal to the lesser  
18 of said number of data words to be transferred and said  
19 block size to be transmitted without interruption,  
20 thereafter

*pub B6*  
21 ending data transfer if data transferred equals  
22 said number of data words to be transmitted, and  
23 suspending data transfer, releasing control of data  
24 transfer on said data bus and re-requesting bus control  
25 from said bus arbiter.

1 11. The data transfer system of claim 10, wherein:  
2 at least one first bus supplying/receiving device  
3 consists of a central processing unit which is further capable  
4 of controlling data transfer, said central processing unit  
5 connected to said direct memory access unit for loading data  
6 into said counter value register and said block size register.

1 12. The data transfer system of claim 1, wherein said  
2 plurality of bus devices consist of first bus devices and said  
3 data bus consists of a first data bus, said data transfer  
4 system further comprising:  
5 a plurality of second bus devices, at least one second  
6 bus device being a second bus data supplying device capable of  
7 supplying data, at least one second bus device being a second  
8 bus data receiving device capable of receiving data and at  
9 least one second bus device being a second bus master device  
10 capable of requesting and controlling data transfer, each  
11 second bus device having a predetermined data size;  
12 a second data bus having said predetermined data size  
13 connected to each of said plurality of second bus devices and  
14 capable of transferring data from a second bus data supplying  
15 device to a second bus data receiving device under control of  
16 a second bus master device;

17 a bus bridge connected to said first data bus and said  
18 second data bus, said bus bridge capable of transferring data  
19 between said first bus devices and said second bus devices;  
20 and

21 wherein said direct memory access unit stores said  
22 predetermined data size in said source word size register for  
23 data transfer from a second bus device to a first bus device  
24 via said bus bridge and stores said predetermined data size in  
25 said target word size register for data transfer from a first  
26 bus device to a second bus device via said bus bridge.